

REMARKS

By the present amendment, independent claim 1 has been amended to further clarify the concepts of the present invention. More particularly, claim 1 has been amended to incorporate the subject matter of claim 3 therein and accordingly claim 3 has been canceled. This amendment to claim 1, among other things, excludes the composition according to Comparative Example 15 as set forth in the subject application.

It is submitted that these amendments to claim 1 are helpful in distinguishing the subject claims and do not raise new issues which would require further consideration and/or search. In addition, it is submitted that such amendments place the application in better form for appeal by materially reducing or simplifying the issues for appeal. Furthermore, no additional claims are presented without cancelling a corresponding number of finally rejected claims. In view of the above, it is submitted that entry of the above amendments is in order and such is respectfully requested.

In the Office Action, claims 1, 3, 6, 9 and 11 were rejected under 35 USC § 102(b) as being anticipated by the newly cited patent to Lane or, alternatively, under 35 USC § 103(a) as being unpatentable over the same patent to Lane, in view of the previously cited patents to Kato et al and Robinson et al. In making the former rejection, it was asserted that the Lane patent teaches a processing aid composition of a core-shell structure and of

the recited molecular weight which is obtained from monomers which meet the recitations of independent claim 1. Although it was acknowledged that the Lane patent does not teach the recited initiators or chain transfer agents, e.g., an initiator having a t-butyl peroxy group or a mercaptan chain transfer agent, it was asserted that the products of disclosed method using the same monomers would be the same as the recited processing aids.

As to the latter rejection, it apparently was asserted that it would be obvious from the teachings of the secondary patents to Kato et al and Robinson et al to conduct the polymerization according to the Lane patent with initiators or chain transfer agents according to the secondary patents. Reconsideration of these rejections in view of the above claim amendments and the following comments is respectfully requested.

Before discussing the rejection in detail, a brief review of the presently claimed inventions may be quite instructive. The subject matter of claim 1 relates to a processing aid for a thermoplastic resin, the processing aid being obtained by multi-step emulsion-polymerization of a composition which consists essentially of a specific (meth)acrylate, another alkyl acrylate and, optionally, another vinyl monomer copolymerizable therewith, in the presence of a polymerization initiator. The obtained processing aid has a particle structure as it is obtained by emulsion-polymerization. In addition, the processing aid, since it is obtained by multi-step emulsion polymerizing as described in Claim 1, has a core-shell structure. The processing aid of the present invention as obtained by multi-step

emulsion polymerization of the above monomers provides a processing aid which yields excellent processability, in particular, provides properties such as a peeling property from a metal surface at a high temperature.

In accordance with subject matter defined by independent claims 9 and 11, a processing aid providing an excellent roll peeling property can be obtained by using a mercaptan containing an alkyl ester group having C<sub>4-20</sub> alkyl group as a chain transfer agent. In this regard, attention is directed to the composition of Example 8, which satisfies claims 9 and 11, where the roll peeling property is considerably improved to a value of 10. In distinct contrast, the compositions of Comparative Examples 8 and 9, where tert-dodecyl mercaptan and n-dodecyl mercaptan, which do not satisfy claims 9 and 11, are used, the roll peeling properties only have a value of 5. From this comparison, it is evident that the compositions of the presently claimed invention have an excellent roll peeling property. Thus, the processing aid of the presently claimed invention has excellent processability and, in particular, provides excellent properties such as a peeling from a metal surface at a high temperature. It is submitted that such processing aids are not taught or suggested by the cited patents, whether taken singly or in combination.

More particularly, the Lane patent discloses at column 1, lines 61 to 64 that "an object of the present invention to provide a material which simultaneously improves notched Izod impact strength and melt strength of poly(alkylene terephthalates)." As is

stated in the Action, a multiple-stage polymer having core-shell structure is disclosed in this patent.

The Lane patent teaches at column 2, lines 3 to 7 and 31 to 35 that the multiple-stage polymer has a rubbery first stage and an epoxy group-containing hard final stage, where it is highly preferred that the first stage includes a graft cross-linking monomer and also optionally includes a cross-linking monomer. Generally, when the rubbery core in the first stage is not finally cross-linked and is left uncross-linked, impact resistance cannot be improved. This is because the multiple-stage polymer barely maintains its structure in the molding and processing step of adding the polymer to poly(alkylene terephthalates) and disperses into pieces. Thus, in the process of the multiple-stage polymer of the Lane patent, the graft cross-linking monomer or the cross-linking monomer is necessary. In all examples of the Lane patent, allyl methacrylate (AIMA) is used as a graft cross-linking agent and 1,3-butylene diacrylate (BDA) is used as a cross-linking agent.

Of particular significance is that when the multiple-stage polymer is prepared by using the graft cross-linking agent or the cross-linking agent as described above, the molecular weight of the obtained polymer is commonly regarded as being unlimited. In distinct contrast, the weight average molecular weight of the processing aid according to the presently claimed invention is the range of 10,000 to 300,000. Consequently, the processing aid of present invention is completely different from the multiple-stage polymer

of the Lane patent in terms of the weight average molecular weight.

In the Action, it was asserted that Table 2 of the Lane patent indicates that the products of the patent possess a molecular weight which is the same as the recited molecular weight range. However, Table 2 reports the melt viscosity of a resin composition at injection molding after compounding the multiple stage polymer (impact modifier) with PET. Such a melt viscosity does not correspond to molecular weight.

Furthermore, the presently claimed invention also differs from the Lane patent in terms of a polymerization initiator. The Lane patent does not disclose the use of an organic peroxide having a tertiary-butyl peroxy group as a polymerization initiator, nor does the patent disclose the use of a chain transfer agent. The terminal of a polymer depends on the initiator and as a result, the properties of the obtained polymer also depend on the initiator used in each polymerization. This is because a polymerization starts from a radical generated by the initiator and the residues of the initiator are incorporated in the terminal of the polymer chain. The dependence is evidenced in Tables 5 and 11 of the present specification. When an organic peroxide having a tertiary-butyl peroxy group is used in the amount recited in claim 1, roll peeling property is considerably improved.

Chain transfer agents are also incorporated in the terminal of the polymer in the same manner as the polymerization initiator and affect the properties of the obtained polymer. From the description of Table 4 of the present specification, it is clear that when chain transfer agents are used, the roll peeling property is good.

In summary, the presently claimed invention and the Lane patent differ, among other things, in terms of molecular weight, and in the use of a polymerization initiator or a chain transfer agent. As described above, the multiple-stage polymer disclosed in the Lane patent has a completely different molecular weight than the processing aid of the presently claimed invention. Further, the Lane patent has no recognition of improving the peeling property from a metal surface at a high temperature by adjusting the molecular weight to the specific range.

It is submitted that the Kato et al and Robinson et al patents do not supply these teaching deficiencies the Lane patent. More particularly, the Kato et al patent relates to an impact-resistant methyl methacrylate resin obtained by polymerizing methyl methacrylate in the presence of an ethylene copolymer containing epoxy group. The disclosed process of the Kato et al patent for preparing ethylene copolymer containing epoxy group is a bulk polymerization. Since the polymer is not polymerized by emulsion polymerization, the above-described effects cannot be obtained in the Kato et al patent. Consequently, the presently claimed invention cannot be reached from a combination of the Lane and Kato et al patents.

The Robinson et al patent relates to an aqueous thickener or thixotropic polymers which are effective thickeners for a wide variety of aqueous systems. Therefore, the thickener is used in a technical field different from that of the processing aid for thermoplastic resin as presently claimed. Since the Robinson et al patent does not relate to a processing aid, there is no teaching or suggestion of improving a peeling property from a metal surface at a high temperature. As set forth above, this improvement in the peeling property is not taught or suggested in the Lane patent. Therefore, the presently claimed invention cannot be realized from a combination of the Lane and Robinson et al patents.

For the reasons stated above, withdrawal of the rejections under 35 U.S.C. § 102(b) and/or § 103(a) and allowance of claims 1, 6, 9 and 11 over the cited patents are respectfully requested.

In view of the foregoing, it is submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

In the event this paper is not timely filed, the undersigned hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with

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respect to this paper.

Respectfully submitted,

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